

Using Nature to Redesign Places of Worship in Muncie, IN

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This project integrates environment, economy, and society to develop more sustainable and healthy places of community worship. Adhering to the professional code of ethics for interior design and construction management (health, safety, and welfare), undergraduate students from the Interior Design (ID) and Construction Management (CM) programs manage an active, engaged, learner-centered environment as they explore Muncie's diversity of cultures and faith traditions to redesign two places of worship in an environmentally sustainable manner.

This project is two semesters long:

In Spring 2021, approximately 30 students from the sophomore-level IDES 225 History of Interior Design class (a required course in the Interior Design major) and 20 students from the sophomore-level CM 262 Electrical Construction (a required course in the Construction Management major) will conduct observations and interviews at the Islamic Community Center (ICM) and Riverside United Methodist Church (RUMC). The students will survey both buildings for existing biophilia (i.e. use of natural dynamic/diffused light, blurring boundaries of indoors/outdoors, natural textures, presence of water, airflow, natural scents, scattered vegetation, plant-life, areas of refuge, etc.). Using devices such as thermal cameras and light meters students will record existing efficiency conditions (i.e. energy, wind, hydro, solar, people, etc.) onto their iPad at the sites. Students will interview faith leaders to identify and document sustainable patterns of the building use and develop a post-occupancy measure use while evaluating biophilic design adaptations.


In Fall 2021, the same students from IDES 225 will advance to junior-level IDES 324 Interior Design Studio 3 (another required course) and partner with 20 new students from sophomore CM 261 Mechanical Construction (another required course) to redesign both places of worship. The CM students will generate an energy model for each building based on its current physical conditions and operational routines, and the ID students will develop a variety of approaches to renovate the two buildings, learning from nature to focus on biophilic/sustainable techniques. The ID and CM, student cohorts will work together to present their iterations to both community partners; using nature as a model, the final design solutions for each building will show the benefits of enhanced biophilia as well as include an energy efficiency plan showing an initial cost versus savings. Students also will survey building users to gauge their perceptions and willingness to invest in and adopt these

approaches; students' analysis of the data collected will examine correlations between parameters related to renovation and parameters related to users' willingness to adopt the proposed changes.

During the course of the project, a guest expert on biophilia will share in the classroom to help guide the design; the PIs have confirmed Sonja Bochart (IIDA, LEED AP BD+C, WELL AP), Principal of Shepley Bulfinch Arizona, as a presenter. With over 50 biophilic workshops conducted, Bochart will develop a specialized workshop for the CMID students working on this IL project focusing on Biophilic by Design: Spirit of Place. Facilitated to meet the requirements for Biophilic Design, as it relates to the WELL Building Standards, the hands-on, inspirational and educational workshop will be project specific to RUMC and ICM and facilitated in an educational, research-based, mindful, creative and multi-sensory approach.

The final result, presented in Fall 2021, will be a biophilic project design strategy aimed to positively affect human and ecological health and well-being for the RUMC and ICM facilities.

Participants & Community Partners

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Riverside United Methodist Church(teams 1-3)	Islamic Center of Muncie(teams 4-6)
Team 1: <ul style="list-style-type: none"> • ID member/lead-Analiese Hooten aphooten@bsu.edu • ID member/co-lead-Alexis King akking@bsu.edu • ID member- Kerrigan Jetmore kijetmore@bsu.edu • ID member-Hannah Garrett hlgarrett@bsu.edu • ID member- Ellie Sprecher elsprecher@bsu.edu • ID member- Karlie Potts krpotts2@bsu.edu • CM member- Brandon Martens bamartens@bsu.edu • CM member- Shane Shuler scshuler@bsu.edu • CM member- Tim Ott teott@bsu.edu 	Team 4: <ul style="list-style-type: none"> • ID member/lead- Corrionna Sivils clsivils@bsu.edu • ID member/co-lead -Jalyn Bowie jlbowie@bsu.edu • ID member- Kayla Brownie krbrownie@bsu.edu • ID member-Asia Muhammad aimuhammad2@bsu.edu • ID member- Hayley Laker hlaker@bsu.edu • ID member- Ethan Lee emlee@bsu.edu • CM member-Emily Kirby ejkirby@bsu.edu • CM member- Joe Huff jdhuff2@bsu.edu • CM member-Kenny Mills kjmills@bsu.edu • CM member- Alex Angle akangle@bsu.edu
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Teams consist of interior design and construction management students

Project Director: Dr. Sarah Angne Alfaro, interior design

Co-project Director: Dr. Sherif Attallah, construction management

Community Partners:

- Riverside United Methodist Church (RUMC), 1201 N Wheeling Avenue, Muncie, IN, 47303
- Islamic Center of Muncie (ICM), 5141 Hessler Road, Muncie, IN, 47304

Worship & Nature →

Participants & Community Partners

Worship & Nature

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Two questions at the heart of the study:

1. What effects can biophilia have in places of worship, where people come to perform acts of devotion, study religion, meet with friends, family, and community?
2. How can religious beliefs, aesthetic choices, and the economic and technological capacity of those who create or worship in these spaces be transformed through an incorporation of nature?

Incorporating biophilic design in places of worship will amplify the connection between nature and spirituality that these spaces seek to foster. By incorporating biophilic design, building occupants will feel more attracted to the space's nature-inspired adaptations while also enjoying increased monthly savings in utility costs from energy efficiency adaptations.

PIs Alfaro, Assistant Professor of Interior Design, and PI Attallah, Associate Professor of Construction Management, bring unique experiences to nature-based design that inform the creation of this pilot immersive learning course focusing on the value of nature in the built environment. Alfaro's scholarship focuses on the design and impact of sacred spaces, and

Attallah's scholarship focuses on sustainable efficiencies through technology. Together, these two emphases will provide an innovative experience for the students and an impactful experience for two community partners.

What is Biophilia?

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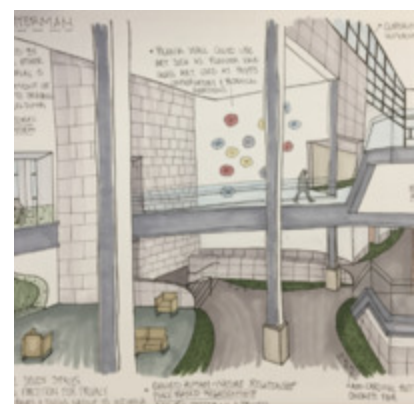
Biophilic Design Elements & Patterns	THE SIX BIOPHILIC DESIGN ELEMENTS <small>Table reprinted with permission from Steve Kellert</small>	Natural shapes and forms Botanical motifs Tree and columnar supports Animal (mainly vertebrate) motifs Shells and spirals Egg, oval, and tubular forms Arches, vaults, domes Shapes resisting straight lines and right angles Simulation of natural features Biomorphy Geomorphology Biomimicry	Natural patterns and processes Sensory variability Information richness Age, change, and the patina of time Growth and efflorescence Central focal point Patterned wholes Bounded spaces Transitional spaces Linked series and chains Integration of parts to wholes Complementary contrasts Dynamic balance and tension Fractals Hierarchically organized ratios and scales
	Environmental Features Color Water Air Sunlight Plants Animals Natural materials Views and vistas Façade greening Geology and landscape Habitats and ecosystems Light and Space Natural light Filtered and diffused light Light and shadow Reflected light Light pools Warm light Light as shape and form Spaciousness Spatial variability Space as shape and form Spatial harmony Inside-outside spaces	Place-based relationships Geographic connection to place Historic connection to place Ecological connection to place Cultural connection to place Indigenous materials Landscape orientation Landscape features that define building form Landscape ecology Integration of culture and ecology Spirit of place Avoiding placelessness	Evolved human-nature relationships Prospect and refuge Order and complexity Curiosity and enticement Change and metamorphosis Security and protection Mastery and control Affection and attachment Attraction and beauty Exploration and discovery Information and cognition Fear and awe Reverence and spirituality

There are six principles of biophilia according the Steven Kellert.

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Students look for biophilia on campus.

Students write and reflect about biophilia.



Effects of Biophilic Design on Working Offices

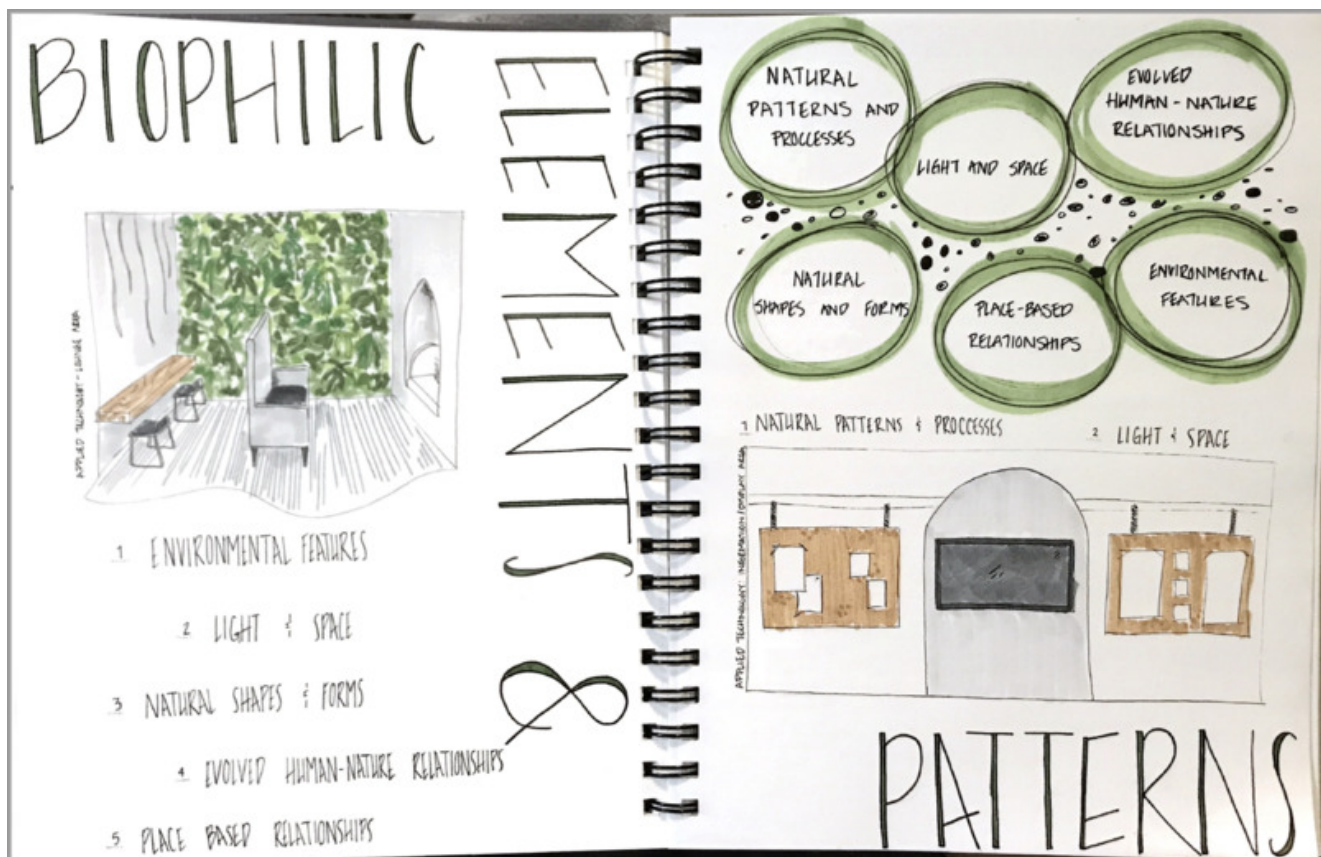
Biophilic design has many benefits, both physically and psychologically, and the inclusion of biophilia in places of working can make studying and performing acts of devotion an experience of something greater than what is on the earth. Creating a space that includes natural elements and features can increase comfort in a space, and there is a high priority for all places of working. These spaces are meant to be a safe haven away from a busy world outside, much like going out into nature in an escape from a big city. This also means that these spaces should include calming elements that aren't distracting and blend in enough to the environment that one feels familiar and comfortable. Thus, making these spaces as warm and welcoming as possible is something to be thoughtful and serious about.

A perfect example of the effects of biophilic design is Antonio Gaudí's Sagrada Família. In a 1987-1988 survey that gathered people's most uncomfortable architectural experiences in the United States, for which all three magazines, it was found that this structure in Barcelona, Spain, had a greater effect on people than even Notre Dame or the Parthenon. The question is, does biophilia play a role in that? The beauty, the colors and the beautiful use of light strongly suggests that the popularity of the space is directly correlated to biophilic elements. Gaudí himself once claimed that "God created and he just inspired" (Gaudí 1984), thus making the connection that this space was inspired by nature, which is not and could not be made made.

In a journal titled *Environment International*, it was discovered after careful study that

Using nature-s1

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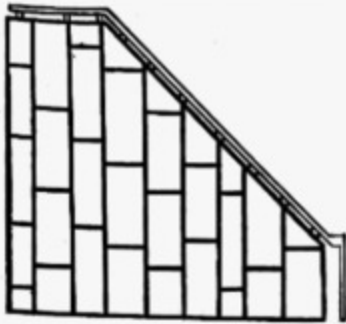
Using nature-s1

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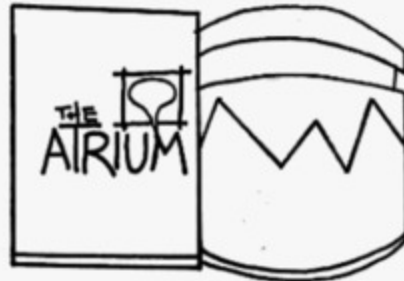
"Using nature-s1," *Immersive Learning Showcase 2021*, accessed July 14, 2021, <https://digitalresearch.bsu.edu/immersive-learning-showcase-2021/items/show/228>.

Using nature-s2

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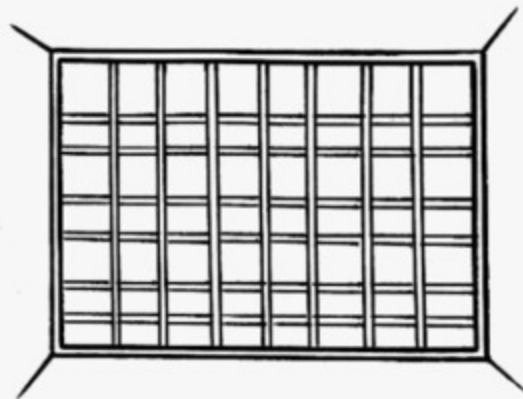
NATURAL PATTERNS
AND PROCESSES
-RIGHT ANGLES



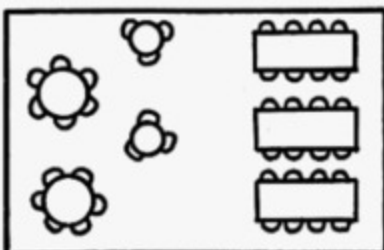
PLACE-BASED
RELATIONSHIPS
-SIGNAGE+MOUNTAIN
SHAPES



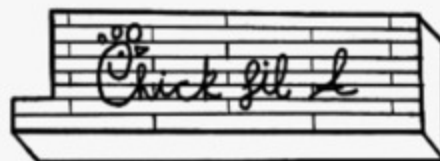
ENVIROMENTAL
FEATURES
-PLANTS



LIGHT AND SPACE
-NATURAL LIGHT



EVOLVED HUMAN-
NATURE RELATIONSHIPS
-ORDER+COMPLEXITY



NATURAL SHAPES +
FORM
-WOOD

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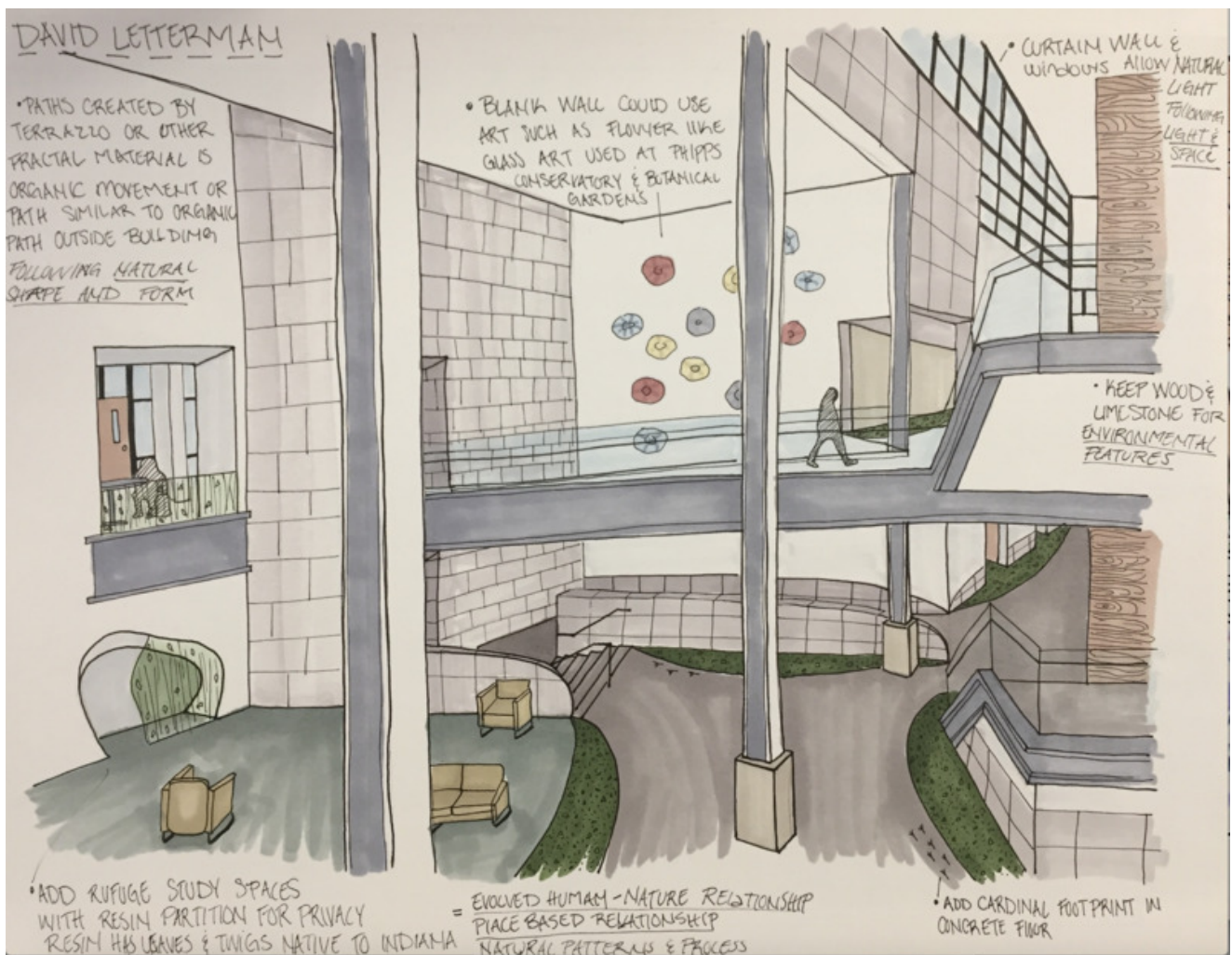
Using nature-s2

Citation

“Using nature-s2,” *Immersive Learning Showcase 2021*, accessed July 14, 2021,
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Using nature-s3

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Using nature-s3

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“Using nature-s3,” *Immersive Learning Showcase 2021*, accessed July 14, 2021, <https://digitalresearch.bsu.edu/immersive-learning-showcase-2021/items/show/230>.

Using nature-s4

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Therese Jirgal

IDES 225

3/19/21

Immersive Learning Workshop

Effects of Biophilic Design in Worship SPaces

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In a journal titled *Environment International*, it was discovered after careful study that after placing participants in 4 different rooms, one with biophilic elements and three others that

Title

Using nature-s4

Citation

“Using nature-s4,” *Immersive Learning Showcase 2021*, accessed July 14, 2021,
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Spring 2021 On-site Photos

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← Students Learning About Biophilia

Spring 2021 On-site Photos





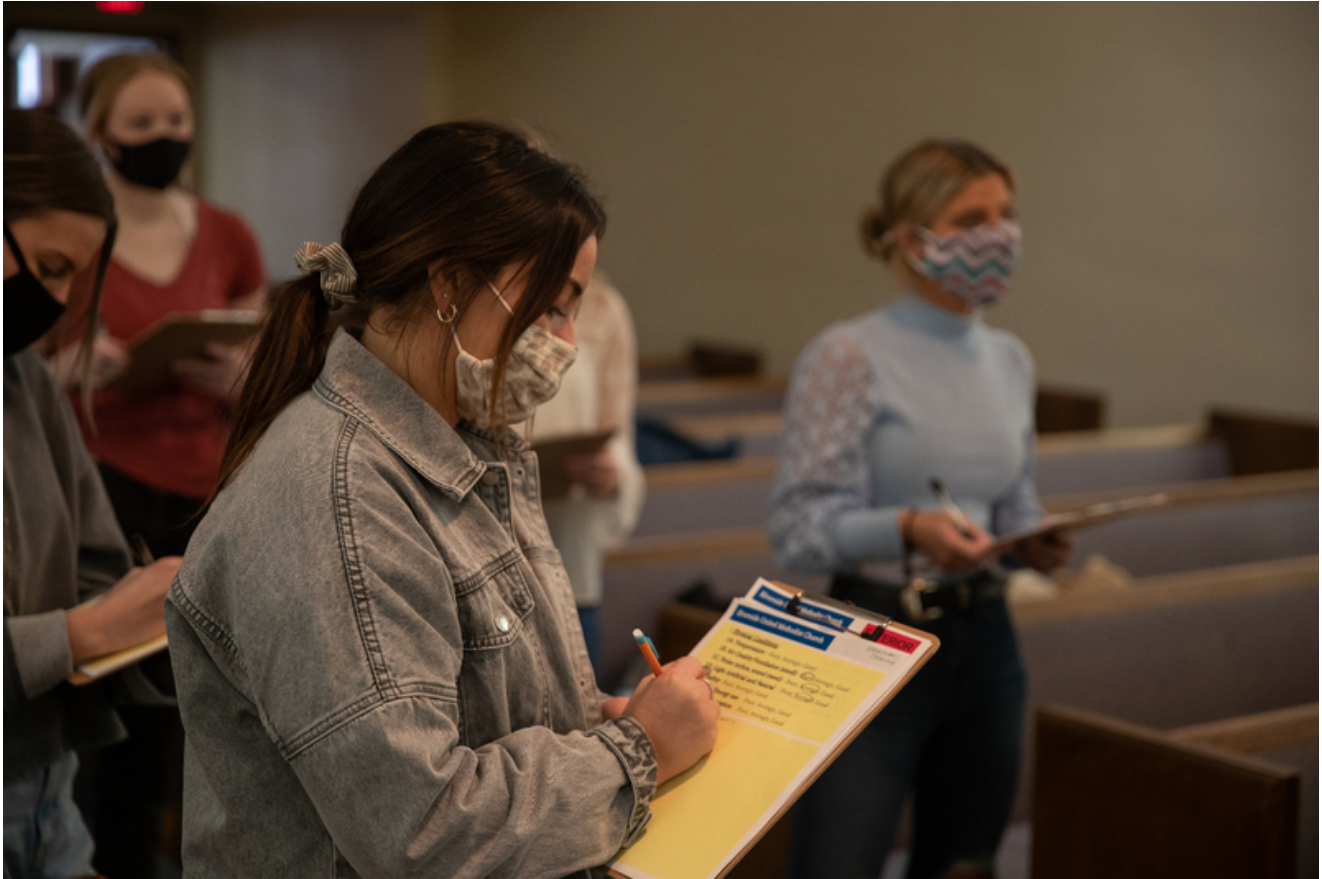


Using Nature Photos

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Using Nature Photos